

Claims

1. In a touch sensing system for identifying at least one active touch
stimulating device, an apparatus for powering the active touch stimulating device,
5 comprising:

a touch sensing area in which said at least one active touch stimulating
device operates;

a transducer disposed operatively associated with said touch sensing area
for transmitting a power signal to said at least one active touch stimulating
10 devices;

each of said active touch stimulating devices including means for receiving
said power signal and converting said power signal to electrical operating power
for said active touch stimulating device;

said transducer includes a first antenna extending about the perimeter of
15 said touch sensing area, and further including means for driving said first antenna
to generate an EM field within said touch sensing area.

2. The apparatus for powering an active touch stimulating device of claim
1, wherein said at least one touch stimulating device includes a second antenna
20 adapted to receive power from said EM field within said touch sensing area.

3. The apparatus for powering an active touch stimulating device of claim 2, wherein said second antenna is a resonant antenna tuned to the frequency of said EM field.

4. The apparatus for powering an active touch stimulating device of claim 3, further including rectifying means connected to the output of said resonant antenna to generate operating power for said active touch stimulating device.

5. The apparatus for powering an active touch stimulating device of claim 3, wherein said resonant antenna includes an inductor coil and a capacitor connected to be tuned to the frequency of said EM field.

6. The apparatus for powering an active touch stimulating device of claim 4, wherein said touch stimulating device includes touch signaling means incorporating spread spectrum signals.

7. In a touch sensing system for identifying at least one active touch stimulating device, an apparatus for powering the active touch stimulating device, comprising:

a touch sensing area in which said at least one active touch stimulating device operates;

a transducer operatively associated with said touch sensing area for transmitting a power signal to said at least one active touch stimulating devices;

each of said active touch stimulating devices including means for receiving said power signal and converting said power signal to electrical operating power for said active touch stimulating device;

wherein said transducer includes a first acoustic transducer, and further
5 including means for driving said first acoustic transducer to generate an acoustic field in said touch sensing area.

8. The apparatus for powering an active touch stimulating device of claim 7, wherein said at least one touch stimulating device includes a second acoustic
10 transducer adapted to receive acoustic power from said acoustic field within said touch sensing area.

9. The apparatus for powering an active touch stimulating device of claim 8, wherein said second acoustic transducer generates an AC power signal in
15 response to receiving said acoustic field.

10. The apparatus for powering an active touch stimulating device of claim 9, further including rectifying means connected to the output of said second acoustic transducer to generate operating power for said active touch stimulating
20 device.

11. The apparatus for powering an active touch stimulating device of claim 7, wherein said touch stimulating device includes touch signaling means incorporating spread spectrum signals.

12. The apparatus for powering an active touch stimulating device of claim 8, further including a conductive layer within said touch sensing area, said first acoustic transducer being coupled to said conductive layer to transmit said power signal through said conductive layer, said second acoustic transducer being coupled to said conductive layer to receive said acoustic field energy.

13. In a touch sensing system for identifying at least one active touch stimulating device, an apparatus for powering the active touch stimulating device, comprising:

a touch sensing area in which said at least one active touch stimulating device operates;

a transducer operatively associated with said touch sensing area for transmitting a power signal to said at least one active touch stimulating devices;

a conductive layer disposed within said touch sensing area, said transducer including at least one power signal transmitter coupled to said conductive layer to generate an EM field in said conductive layer;

each of said active touch stimulating devices including means for receiving said power signal and converting said power signal to electrical operating power for said active touch stimulating device.

14. The apparatus for powering an active touch stimulating device of claim 13, wherein said transducer includes at least one power signal transmitter coupled to peripheral portions of said conductive layer and controlled to establish an AC voltage gradient across said conductive layer.

15. The apparatus for powering an active touch stimulating device of claim 14, wherein said at least one touch stimulating device includes a pair of contact points adapted to electrically engage said conductive layer, said pair of contact points being spaced apart to acquire a voltage differential from said voltage gradient in said conductive layer.

16. The apparatus for powering an active touch stimulating device of claim 15, further including rectifying means connected to said voltage differential to generate operating power for said active touch stimulating device.

17. The apparatus for powering an active touch stimulating device of claim 13, wherein said touch stimulating device includes touch signaling means incorporating spread spectrum signals.

18. In a touch sensing system for identifying at least one active touch stimulating device in a touch sensing area, a method for powering the active touch stimulating device, comprising:

providing a first antenna extending about the perimeter of said touch sensing area, and driving said first antenna to generate an EM field within said touch sensing area;

providing each of said active touch stimulating devices with means for
5 receiving a power signal from said EM field and converting said power signal to electrical operating power for said active touch stimulating device.

19. In a touch sensing system for identifying at least one active touch stimulating device in a touch sensing area, a method for powering the active
10 touch stimulating device, comprising:

providing a conductive layer said touch sensing area;

generating an EM field in said conductive layer, said EM field having a voltage gradient across said touch sensing area;

providing each of said active touch stimulating devices with means for
15 receiving a power signal from said EM field and converting said power signal to electrical operating power for said active touch stimulating device.

20. The method for powering an active touch stimulating device of claim 19, further including the step of providing said at least one touch stimulating
20 device with a pair of contacts adapted to electrically engage said conductive layer and pick up a voltage differential from said EM field in said conductive layer.

21. The method for powering an active touch stimulating device of claim 20, further including the step of providing said at least one touch stimulating device with a rectifier for receiving said voltage differential and generating DC operating power.

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22. In a touch sensing system for identifying at least one active touch stimulating device in a touch sensing area, a method for powering the active touch stimulating device, comprising:

providing a first acoustic transducer adjacent to said touch sensing area,
10 and driving said first transducer to generate a acoustic field within said touch sensing area;

providing each of said active touch stimulating devices with means for receiving a power signal from said acoustic field and converting said power signal to electrical operating power for said active touch stimulating device.

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23. In a touch sensing system for identifying at least one active touch stimulating device in a touch sensing area, a method for powering the active touch stimulating device, comprising:

providing a conductive layer in said touch sensing area;

20 providing a first acoustic transducer coupled to said conductive layer, and driving said first transducer to generate a acoustic field within said conductive layer;

providing each of said active touch stimulating devices with means for contacting said conductive layer and receiving a power signal from said acoustic field and converting said power signal to electrical operating power for said active touch stimulating device.